System Inspector Manual
CHAPTER 7 - SAMPLING

The System Inspector may be required to collect potable water samples for analysis, particularly if the separation between a private water supply well and cesspool, privy or soil absorption system is between 50 and 100 feet. Analyses required would be for coliform bacteria, volatile organic compounds, ammonia nitrogen and nitrate nitrogen. This section provides information on sampling techniques. However, the inspector should always consult with the Massachusetts certified laboratory that will conduct the analyses to review sampling procedures and to obtain proper sample containers.

This is a brief synopsis of sampling procedures for the analyses required under Title 5 and is not intended to be all inclusive. Further information can be obtained from the latest edition of Standard Methods for the Examination of Water and Wastewater, published jointly by the American Public Health Association, the American Water Works Association and the Water Environment Federation (formerly the Water Pollution Control Federation).

Coliform bacteria:

Samples for microbiological examination should be collected in bottles that have been thoroughly cleansed and rinsed, given a final rinse with distilled water and sterilized. For samples expected to have any residual chlorine (unlikely in a private well), the sample bottles should be treated with a dechlorinating agent such as sodium thiosulfate.

The water sample should be taken at a tap that is fed from the well. The line should be flushed for approximately 2 or 3 minutes prior to sampling. In all cases, proper aseptic techniques should be observed in order to avoid sample contamination. Aseptic techniques are those procedures that prevent biological contamination of the sample itself or of the sampling apparatus that could contaminate the sample. Such procedures include:

- Keeping sterilized sample bottles closed until just before the sample is to be collected.
- Do not touch the lip of the bottle or any other surface that will come into contact with the sample.
- Wear rubber gloves, if possible.
- Do not contaminate the surface of the cap or inner neck of the bottle
- Fill the container without rinsing.
- Immediately replace the cap.

After the tap has been flushed, reduce water flow to permit filling the bottle without splashing. When the sample is collected (approximately 250 mL), make sure to leave an air space of at least an inch to permit mixing by shaking prior to examination.

Samples must be analyzed within 24 hours of collection and must be kept in an iced cooler if they cannot be analyzed within one hour of collection. Upon receipt at the laboratory, the samples should be refrigerated immediately.

Volatile organic compounds:

Use 25 or 40 mL vials equipped with a screw cap with a TFE-faced silicone septum in the center. Vials should be washed and dried before use. Usually, the laboratory will provide the sample collector with the properly prepared vials. Samples should be collected from the same tap as the coliform samples and after the temperature of the flowing water has stabilized (about 10 minutes).

Collect all samples in duplicate and prepare replicate field reagent blanks with each sample set. (A sample set consists of all the samples collected from the same general sampling site at approximately the same time). The sample bottle should be filled just to overflowing without passing air bubbles through the sample or trapping air bubbles in the sealed bottle. The samples should be maintained at a temperature of 4^{o} C. The sample vials should include 4 drops of hydrochloric acid (HCl) as a preservative. If one expects residual chlorine (unlikely in a private well) an appropriate reducing agent should also be added.

When the sample is collected, tightly seal the bottle with the TFE face down. Chill the samples to 4^{o} C immediately after collection and hold at that temperature in an atmosphere free from organic vapors until analysis. Normally analysis should be performed within 14 days after collection.

Ammonia nitrogen and nitrate nitrogen:

Both these constituents can be sampled in either plastic or glass containers. Minimum sample size for ammonia is 500 mL and for nitrate, 100 mL. There are no specialized procedures for collecting samples to analyze for these constituents; however, ammonia does require preservation in sulfuric acid (H_2SO_4) to a pH less than 2. The sample should be refrigerated if not analyzed immediately. Nitrate does not require preservation other than refrigeration if it is not analyzed immediately.